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ABSTRACT

This study investigates biracial learning teams and cross-racial friendship and interaction in desegregated junior high schools. Subjects were 424 seventh and eighth grade students in twelve English classes (164 of them black, 256 white, and 4 Asian). Each of five teachers taught 1-2 experimental classes and 1-2 control classes for ten weeks. Experimental students studied class worksheets in 4-5 biracial teams, and received recognition based on the sum of members' quiz scores. Control students studied alone, and received individual quiz scores only. Results indicated that the experimental students increased from pre-test to post-test more than the control students in the number of cross-racial friendship choices made on a sociometric instrument, and in the percentage of cross-racial choices over all choices. Behavioral observation showed that a higher proportion of peer interactions were cross-racial in experimental classes than control. These results provide further support for the use of multi-racial learning teams in desegregated classrooms. (Author/EB)

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EFFECTS OF BIRACIAL LEARNING TEAMS ON CROSS-RACIAL FRIENDSHIP AND INTERACTION

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Robert E. Slavin

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The Johns Hopkins University

Baltimore, Maryland

Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through three programs to achieve its objectives. The Policy Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed the Teams-Games-Tournament (TGT) instructional process for teaching various subjects in elementary and secondary schools, and has produced a computerized system for school-wide attendance monitoring. The School Process and Career Development program is studying transitions from high school to postsecondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes.

This report, prepared by the Policy Studies in School Desegregation program, examines the effects of a classroom team structure, Student Teams-Achievement Divisions, on racial integration in twelve junior high classrooms.

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Abstract

This study investigates biracial learning teams and cross-racial friendship and interaction in desegregated junior high schools. Subjects were 424 seventh and eighth grade students in twelve English classes (White = 256, Black = 164, Oriental = 4). Each of five teachers taught 1-2 experimental classes and 1-2 control classes for ten weeks. Experimental students studied class worksheets in 4-5 member biracial teams, and received recognition based on the sum of members' quiz scores. Control students studied alone, and received individual quiz scores only. Results indicated that the experimental students increased from pre- to posttest more than control students in the number of cross-racial friendship choices made on a sociometric instrument, and in the percentage of cross-racial choices over all choices. Behavioral observation showed that a higher proportion of peer interactions were cross-racial in experimental classes than in control. These results provide further support for the use of multi-racial learning teams in desegregated classrooms.

In the past few years, there has been increasing attention among educators to the problem of race relations in integrated schools. This attention is due to an increase in the number of school districts that are desegregating their schools on a broad scale, but also to the discovery that simply placing students of different races or ethnic groups in the same school and "treating everyone alike" does not necessarily lead to positive intergroup relations (Dorr, 1972; Forehand and Ragosta, 1976).

However, in the past three to four years, there have appeared a set of techniques that have been found to have positive effects on race relations in integrated schools. These techniques involve the use of multi-racial learning teams--small groups of students of different races who do school work together and are rewarded at least in part based on their group performance. These techniques rely on the general principle that group cooperation increases mutual attraction among group members (Lott and Lott, 1965; Slavin, in press a), and are based on Allport's (1954) prediction that equal-status, cooperative interaction among individuals of different races would break down prejudices between them.

The evidence relating multi-racial learning team techniques to gains in race relations is comparatively consistent. DeVries, Edwards, and Slavin (in press) conducted four studies evaluating Teams-Games-Tournament (TGT), a team technique that uses academic games as well as 4-5 member, multi-racial learning teams. Three of these studies demonstrated positive effects of TGT on cross-racial attraction, and the fourth found positive treatment effects on cross-racial helping. Slavin (in press b) evaluated a less complicated but similar treatment, Student Teams-Achievement Divisions (STAD), and found positive effects on cross-

racial attraction. Aronson, Blaney, Sikes, Stephan, and Snapp (1975) used a technique called "Jigsaw Teaching" to increase attraction among students in tri-ethnic classes (Black, Chicano, and Anglo), although a later study failed to replicate these findings (Blaney, Stephan, Rosenfield, Aronson, and Sikes, 1977). Johnson and Johnson (Note 1) found that students who worked cooperatively rated their classmates of the opposite race more highly as friends than did students who worked independently, but not more than students who worked competively. Weigel, Wiser, and Cook (1975) assessed the effects of a variety of cooperative learning experiences on cross-racial attitudes, and found that, according to teachers' reports, students in the cooperative treatment engaged in less cross-racial conflict than did students in a control treatment condition. However, this study failed to find effects on cross-racial friendship choices.

While most of the studies that have investigated team learning effects on race relations have been impressive in terms of their effects, many have suffered from methodological limitations. First, of the three studies listed above that involved more than five classes, two (Blaney, et al., and Weigel, et al.) failed to find effects on cross-racial attraction. The third (Aronson, et al.) found effects on general mutual attraction in multi-racial classes, but did not report specific effects on cross-racial attraction. All of the other studies involved five classes or fewer. While small sample size is not a flaw per se, characteristics of particular classes or teachers that are unrelated to experimental manipulations may have a strong influence on many individual student outcomes, particularly on variables such as race relations, which are likely to be influenced by teacher attitudes or personality, class climate, or other factors (Forehand and Ragosta, 1976). Second, most

of the studies have had different teachers teaching experimental and control classes. In the Aronson et al. and Blaney et al. studies, teachers volunteered separately for the experimental and control groups. Again, teacher characteristics may be quite important in determining race relations in the classroom. Allowing teachers to volunteer for experimental or control conditions instead of assigning them randomly compounds this problem by opening the possibility that teachers who would volunteer to use a team technique would be different from teachers who would volunteer for a control treatment.

A third methodological limitation of all of the studies cited above is the exclusive use of self-report measures as dependent variables. This is a serious problem in studies in which students know that they are participating in a study focusing on race relations. Even in studies in which students were not aware that race relations were being studied, such as the DeVries et al. studies on Teams-Games-Tournament, the exclusive use of self-report measures calls into question the importance of the findings; are race relations really improved or do students just say they are?

This study investigates the effects of a multi-racial team learning technique on race relations using an experimental design that avoids the methodological pitfalls outlined above. The team technique used is Student Teams-Achievement Divisions, or STAD (Slavin, in press c). STAD was chosen because of its relative simplicity, its effects in previous studies on academic achievement (Slavin and Wodarski, Note 2), and its effects in a pilot study on cross-racial attraction (Slavin, in press b). Based on the previous research, it is expected that students in classes

using STAD will a) name a larger number of their classmates of other races as friends than will control students; b) name a larger proportion of other race students over all students as friends than will control students; and c) interact with classmates of other races while engaged both in appropriate and inappropriate activities more than students in control classes. Interaction between students when they are engaged in inappropriate (off-task) behavior is assumed to be a more rigorous test of cross-racial attraction than is interaction during on-task behavior. The assignment of students to biracial teams in the experimental classes made it very likely that a substantial portion of peer interaction during times when students were behaving appropriately (peer tutoring) would be across race lines. On the other hand, when students are off-task ("goofing off") they can be interacting with anyone in the class.

The design of this study also permits assessment of a practically and theoretically important question: are team techniques equally effective in increasing the cross-racial attraction of black and white students, or do they primarily change the friendship-choice patterns of one racial group or the other? It is expected that the experimental treatment will be equally effective with both racial groups.

Method

Subjects. The subjects were 424 seventh and eighth grade students. One hundred and sixty-four students (38.7%) were black, 256 (60.4%) were white, and four (0.9%) were oriental. The students were in twelve English classes in two inner-city Baltimore junior high schools. Five teachers (one white male, two black females, and two white females) administered the experimental and control treatments.

Design. The study employed a simple experimental-control group design. Teachers volunteered to participate in the study, and were asked to commit either two or four classes. The intact classes were then randomly assigned within teacher to experimental or control conditions. Thus, four teachers each taught one experimental and one control class, while a fifth taught two experimental and two control classes. A total of 226 students (90 black, or 39.8%; 136 white, or 60.2%) were assigned to the experimental group, and 198 (74 black, or 37.4%; 120 white, or 60.6%; 4 oriental, or 2.0%) were assigned to the control group. The experimental classes ranged from 19% to 70% minority, while the control classes ranged from 17% to 60%.

All classes experienced a ten-week unit on grammar, punctuation, and English usage. Experimental as well as control classes followed a regular weekly schedule of instructional activities. This schedule involved a 2½ period cycle, composed of about forty minutes of lecture/discussion, forty minutes of worksheet work, and a twenty minute quiz. This cycle was repeated twice each week, thus filling all five days of the instructional week. All classes received the same instruction, worksheets, and quizzes. The treatment differed only in the construction of the student worksheet periods and in the use made of student quiz scores (see below).

Students in neither treatment group were made aware that race relations were being measured, and teachers were told that race relations was only one of several dependent variables being measured. Students were also not told whether they were in experimental or control classes, and teachers were informed that the experiments were comparing two interesting instructional methods, not experimental or control treatments.

Treatments

1. Student Teams-Achievement Divisions (STAD).

The experimental treatment was Student Teams-Achievement Divisions, or STAD. Students were assigned to 4-5 member learning teams. Each team represented a cross-section of the class, containing a mix of high, average, and low performing students, boys and girls, and blacks and whites. Teammates met for two periods each week to help one another study for the twice-weekly quizzes. During this time, students were encouraged to tutor one another, to quiz one another on worksheet items, and to otherwise help each other learn the academic material. Following these team practice sessions, the students were individually quizzed. The quiz scores were summed to form a team score after transformation by an "achievement division" system that compares scores with those of other students of similar past performance. This achievement division system provides students of all ability levels with a substantial chance of contributing a maximum number of points to the team score (See Slavin, in press c). Each week, teachers compared the scores earned by each team and prepared class newsletters to announce the highest-scoring teams. The STAD treatment is thus composed of a cooperative task structure (the team practice) and a cooperative reward structure (the team competition for recognition).

2. Control.

As noted above, control students followed the same schedule of instruction, studied the same worksheets, and took the same quizzes as the experimental students. However, control students were not assigned to teams and did not receive newsletters; instead, they worked indepen-

dently and had their quizzes returned with the number correct marked on them.

Measures

Two measurement strategies were employed to assess the treatment effects on race relations: sociometric instruments and behavioral measures.

Sociometric Measure. A sociometric instrument was administered as a pre- and post-measure. It consisted of the question, "Who are your friends in this class?" Twenty-two lines were provided, on which students were instructed to put first and last names of students in their classes who were their friends. The four oriental students were excluded from this analysis because they were all in the same class, and only students who completed both pre-and posttests were included. This procedure gave a total of 149 experimental students and 145 control students.

Behavioral Observation. Beginning in the third week of the project, behavioral observers observed each class once per week. Three observers were trained to an interobserver reliability of .90 to use a simple rating system consisting of five categories: (1) on-task, working independently; (2) on-task, working with a peer; (3) off-task, independently; (4) off-task, interacting with a peer, and (5) other (including interacting with staff, out of seat, and no opportunity to be on-task). Observations were limited to times when students were working on worksheets and were clearly expected to be on-task. During the on-task, working with a peer, and the off-task, interacting with a peer intervals, the observers were instructed to note the race of each student involved in the interaction. The observers recorded the behavior of each student

in the class in sequence for five-second observation intervals, thus sweeping the class several times each period. After training, several reliability checks with each observer obtained a mean inter-observer reliability of .89.

Results

Sociometric Measure

The results of the sociometric measure were analyzed to answer three questions. First, were there differences between the experimental group and the control group in terms of the increase from pre- to post-test in the number of cross-racial friendship choices made by students? This question is important as it indicates the degree to which cross-racial friendships were increased by the experimental treatment. However, this number could increase as a consequence of a general increase in both within-race and cross-race friendship choices in the experimental classes, a frequent finding in team research (Slavin, in press c; DeVries and Slavin, Note 3). Therefore, a second question was asked of the data: were there differences between the experimental and control groups in terms of the increase from pre- to posttest in the proportion of cross-racial friendship choices over all choices made? This question indicates the degree to which race existed as a barrier to friendship in the different groups. The third question asked of the sociometric data concerned possible interactions between race and treatment in effects on both the number and proportion of cross-racial choices. In other words, were the effects due primarily to changes in cross-race friendship choices of one race, or were the effects the same for blacks and whites?

The sociometric data were analyzed by means of two multiple regression analyses. In the first analysis, the dependent variable was the

number of cross-race choices made on the posttest. The independent variables were treatment (experimental or control), race (black or white), and the treatment x race interaction, and cross-race choices made on the pretest served as a covariate. The incremental R^2 due to each of these factors was tested for statistical significance (see Kerlinger and Pedhazur, 1973). The analysis for the proportion of cross-race choices was done in the same fashion, except that the dependent variable was the proportion of cross-race choices over all choices made on the posttest, and the covariate was the proportion of cross-race choices over all choices made on the pretest.

Insert Tables 1 and 2 About Here

Tables 1 and 2 summarize the results of the sociometric analyses. Statistically significant treatment effects were found both for number of cross-race friendship choices ($F(1,292) = 14.61$, $p < .001$) and for the proportion of cross-race choices ($F(1,292) = 11.70$, $p < .001$). As indicated in Table 1, the differences in both cases are due to greater increases from pre- to posttest in the experimental group than in the control group. Thus, the hypotheses concerning the effects of the experimental treatments on cross-race friendship choices were confirmed. No significant differences were found due to race or to the race x treatment interaction.

One additional question asked of the sociometric data was whether the experimental treatments were equally effective in classes with varying percentages of minority students. The percent minority in class x treatment interaction was significant neither for the number of cross-race

choices ($F(1,289) = 1.11$, n.s.) nor for the proportion of cross-race choices ($F(1,289) = 2.03$, n.s.). However, there was a tendency for the treatment effects to be more pronounced when the percent of minority students in the class was high or low than when the class was racially balanced.

Behavioral Observation. The results of the behavioral observations were also analyzed to answer three questions. First, were there differences between the experimental and control classes in the proportion of cross-racial interactions over all peer interactions during times when students were on-task? This measure is primarily an indication of the degree of cross-racial peer tutoring (as opposed to within-racial tutoring). The second question concerned the differences between experimental and control classes in the proportion of cross-racial interactions over all peer interactions during times when students were off-task. The third question addressed treatment effects on total cross-racial peer interaction over all interaction.

All three of the questions addressed by the behavioral observation were analyzed using a 2 x 2 contingency table, with factors treatment and within-race vs. cross-race interaction. A chi square corrected for continuity was computed for each analysis. The results are summarized in Tables 3 and 4.

Insert Tables 3 and 4 About Here

The tables show that there was a higher proportion of cross-race interaction in the experimental classes than in the control classes,

both during times when students were on-task ($\chi^2(1) = 7.21$, $p < .01$) and when they were off-task ($\chi^2(1) = 8.55$, $p < .01$). The chi square for total cross-race interaction is also significant ($\chi^2(1) = 31.60$, $p < .001$). As expected, cross-race interaction was very high in the experimental classes during times when students were on-task, representing 51.5% of all interactions, as compared to 34.2% in the control classes. However, cross-race peer interaction remained high during times when students were not on-task, making up 38.9% of all interactions, as compared with 27.4% in the control classes. Overall, 46.8% of all peer interactions were between students of different races in the experimental group, as opposed to 29.0% in the control group.

Discussion

The results may be summarized as follows. As predicted, the experimental students increased more than the control students from pre- to post-test both in the number of friends they named of the other race and in the proportion of cross-race choices made over all friendship choices. The effects of the experimental treatments on cross-racial attraction were not significantly related to the percentage of minority students in the class.

One way to understand the significance of these findings is to consider them in relation to the proportion of cross-racial choices that would have been expected had race not been a criterion for friendship choice. This is computed as the number of cross-race choices $[2 \times (\#\text{ of whites})\ (\#\text{ of blacks})]$ over the number of possible within-race choices $[(\#\text{ of whites} - 1)\ (\#\text{ of whites}) + (\#\text{ of blacks} - 1)\ (\#\text{ of blacks})]$ plus the possible cross-race choices.

Averaging the class-by-class expected cross-race percentages, it was found that the experimental classes would have been expected to make 42.4% cross-race choices if race were not a criterion for friendship, and the control classes would have made 40.1%.

These expected percentages put the changes brought about by the treatments into clearer focus. The experimental classes increased from 76.3% of their expected cross-race choices to 88.4%, while the control classes declined from 77.3% to 64.3% of their expected choices. Thus, the experimental classes approached a friendship choice pattern that would have been anticipated in a truly color-blind society, while the control group moved in the opposite direction. These percentages also show that the experimental group's 51.5% cross-race peer interactions when students were on-task were actually more than would be expected by chance, 116.0% of the randomly expected pattern, and their off-task interactions were 92.2% of that figure.

This study lends substantial support to the proposition that multiracial learning teams can improve race relations in desegregated schools by increasing cross-race attraction. The results are unlikely to be due to teacher characteristics or selection bias, as each teacher taught one experimental and one control class. All of the experimental classes increased more than their corresponding control classes either in number or in proportion of cross-race choices; in the one case where the experimental class increased less than the control class in the proportion of cross-ethnic choices, the experimental class had started at a high level of cross-race attraction. It is also unlikely that the effects are due to a "Hawthorne effect," as both experimental and control students as

well as teachers were told that both treatments were "experimental." Teacher expectations may have caused some portion of the changes in student's behaviors, but it is unlikely that this had a major impact on the results, as race relations outcomes were mentioned to the teachers as only one of many possible outcomes.

This study further validates the use of team techniques in desegregated classrooms by documenting actual cross-race interaction by means of behavioral observation. The behavioral observation results also lend support to a rather obvious explanation for the effect of multi-racial teams on race relations. Biracial teams increase cross-race contact. Because we know that interpersonal contact is associated with mutual attraction (Lott and Lott, 1965), it is logical that increasing cross-race contact will in turn increase cross-race liking. In fact, the reason that cooperative reward systems increase mutual liking (Slavin, in press a) may be that cooperation simply increases positive contact among group members. This is a distinction that is more interesting for theory than for practice, but is one that is in need of exploration.

Several questions remain to be answered. First, we still do not know how much students' behavior outside of class is influenced by participation in a multi-racial team class. As a practical matter, it may be enough to do all we can to make the school environment as conducive as possible to positive race relations, and then let students' behavior after school take care of itself. However, it would be quite interesting to know how much a team experience affects out-of-school interaction patterns and longstanding friendships.

Second, it may be time to evaluate a multi-racial team approach that

does not rely on team competition. As Weigel et al. (1975) point out, team competition reduces out-group liking as it increases in-group liking. A non-competitive treatment might allow for still greater gains in mutual attraction. However, a non-competitive team technique would have to be carefully designed. Team competition was used in this study as an inexpensive, easy to implement, and easily comprehensible means of making team success important to students, a vital component of any team program. However, this could have been accomplished non-competitively by having a reward for all teams that achieved some pre-established level of performance.

Along the same lines, we now need to develop and evaluate multi-racial team techniques that can be used for longer periods of time and more hours per day. If we wish to have strong and lasting effects on students' patterns of interactions and friendships, we cannot expect a ten-week program for eighty minutes per week to do the job. At this point, it seems justifiable to develop and evaluate multi-racial team techniques as replacements for, rather than supplements to, traditional classroom practice. There is no practical reason that this should not be done. Team techniques have never been shown to impair the other important school outcomes, such as academic achievement; in fact, most have had significantly positive effects on achievement (DeVries and Slavin, Note 3; Lucker, Rosenfield, Sikes, and Aronson, 1976; Slavin and Wodarski, Note 2). They are typically simple and inexpensive to implement. The evidence found in this study and others indicates that by using cooperative learning teams in classrooms, we can improve the classroom experience for all children, and at the same time increase the kind of cross-racial attraction that is crucial if we are to have a truly integrated society.

Table 1

Sociometric Measures

	Mean Numbers of Friendship Choices			
	Control (n=145)		Experimental (n=149)	
	Pre	Post	Pre	Post
Within-Race	6.62	7.37	6.62	6.60
Cross-Race (%)	2.97 (31.0)	2.56 (25.8)	3.14 (32.2)	3.92 (37.3)

Table 2

F Ratios for Numbers and
Proportions of Cross-Race Friendship Choices

	Treatments	Race	T x R
Number of cross-race choices	14.61***	2.72	<1
Proportion of cross-race choices	11.70***	3.44	<1

*** $p < .001$

Table 3

Behavioral Observation

PEER INTERACTION WHILE ON-TASK

		Control	Experimental
Number of Occurrences	Within-Race	48	334
	Cross-Race (%)	25 (34.2)	355 (51.5)

PEER INTERACTION WHILE OFF-TASK

		Control	Experimental
Number of Occurrences	Within-Race	180	251
	Cross-Race (%)	68 (27.4)	160 (38.9)

Table 4

Chi Squares for Proportion of Cross-Race Interactions Over All Interactions

	Chi Square (d.f.=1)	p <
On-task	7.22	.01
Off-task	8.55	.01
Total	31.60	.001

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